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09/876,506	06/06/2001	Matthew D. Giere	10006598-1	9309

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HEWLETT-PACKARD COMPANY
Intellectual Property Administration
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Fort Collins, CO 80527-2400

EXAMINER

NGUYEN, LAM S

ART UNIT	PAPER NUMBER
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2853

DATE MAILED: 03/29/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

3/12

Office Action Summary

Application No.

09/876,506

Applicant(s)

GIERE ET AL.

Examiner

LAM S NGUYEN

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 08 December 2003.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 40-80 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 40 and 43-80 is/are rejected.
- 7) ☒ Claim(s) 41 and 42 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 06 June 2001 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Claim Objections

Claims 59-60 are objected to because of the following informalities: They cannot depend to each other. Appropriate correction is required.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

1. Claims 40, 43-45, 73, 76-80 are rejected under 35 U.S.C. 102(e) as being anticipated by Childers et al. (US 6582062)

The applied reference has a common assignee with the instant application. Based upon the earlier effective U.S. filing date of the reference, it constitutes prior art under 35 U.S.C. 102(e). This rejection under 35 U.S.C. 102(e) might be overcome either by a showing under 37 CFR 1.132 that any invention disclosed but not claimed in the reference was derived from the inventor of this application and is thus not the invention “by another,” or by an appropriate showing under 37 CFR 1.131.

Childers et al. disclose an ink jet printhead comprising:

- a substrate (FIG. 6, element 310);
- an ink feed slot formed through the substrate (FIG. 6, element 400);
- a thin film layer (FIG. 6: the layer that is between layer 330 and layer 310)

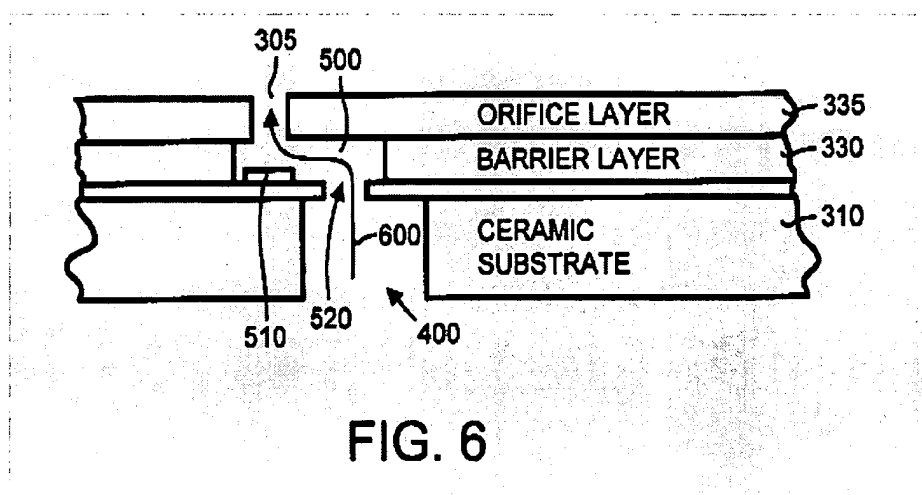
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disposed on a surface of the substrate (FIG. 6, element 310), the thin film layer defining a plurality of firing resistors (FIG. 6, element 510), a plurality of ink feed openings (FIG. 6, element 520) formed through the thin film layer to provide respective ink paths through the thin film layer from the ink feed slot (FIG. 6: the ink path 600);

a barrier/orifice structure (FIG. 6, elements 330 and 335) disposed on the thin film layer, the structure defining an array of nozzles arranged in a plurality of nozzles columns (FIG. 4A, element 420) and an array of firing chambers (FIG. 6, element 500) in correspondence with correspondence with the array of nozzles;

the firing resistors being arranged in correspondence with the firing chambers (FIG. 6, element 510 and FIG. 5, element 410);

the barrier/orifice structure further comprising a continuous rib portion extending between adjacent first and second ones of the plurality of nozzle columns to fluidically separate the first and the second ones of the nozzle columns (FIG. 5-6: the layers 330 and 335 extend in a direction that connects ink feed openings 520 of two nozzle columns);



wherein said plurality of ink feed openings (FIG. 5, element 520) are arranged in

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a first group on a first side of the rib portion (FIG. 5: the group that includes the ink feed holes 520 on the left side of the ink slot 400) for feeding nozzles of the first one of the plurality of columns (FIG. 5: the nozzles that are corresponding to heaters 410 on the left side of the ink slot 400), and a second group on a second side of the rib portion for feeding nozzles of the second one of the plurality of columns (FIG. 5: the group that includes the ink feed holes 520 on the right side of the ink slot 400 and the nozzles that are corresponding to heaters 410 on the right side of the ink slot 400) (**Referring to claim 45, 79**).

Referring to claims 40, 80: wherein the nozzles comprising the array are arranged in subgroups of nozzles, each subgroup comprising at least two nozzles, each subgroup fed with liquid ink through a corresponding ink flow path isolated from other nozzles of the array by the barrier layer/orifice structure, wherein the ink flow path for each nozzle subgroup includes an opening or set of openings through the thin film layer and through the substrate, and wherein each nozzle of a nozzle subgroup is supplied with ink via said opening or set of openings (FIG. 8: the nozzles 820 are grouped into subgroups B, C, M, Y).

Referring to claims 43, 76: the barrier/orifice structure includes a polymer layer (column 11, line 25-30).

Referring to claims 44, 77: the nozzles of each nozzle column have a pitch of 600 nozzles per inch (column 5, line 30-35).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person

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having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 46-49, 52-53, 55-61, 63-68, 72-75 are rejected under 35 U.S.C. 103(a) as being unpatentable over Steinfield et al. (US 5984464) in view of Maeda (US 6053599).

Referring to claims 46, 56, 65, 72, 73-75:

Steinfield et al. discloses a fluid ejecting printhead, comprising:

a substrate having a surface (FIG. 13, element 10), and a fluid supply formed through the substrate to the surface (FIG. 13, element 52);

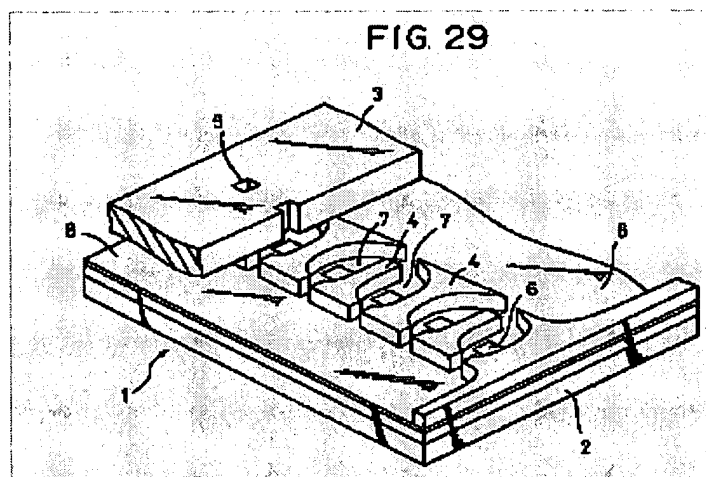
a columnar group of drop generators (FIG. 14) formed on the surface that are arranged into subgroup (FIG. 14, three drop generators)

printhead electronics that provide firing pulses to the drop generators such that no drop generators in the same subgroup are activated sequentially or simultaneously (FIG. 14 and 16 and TABLE 1: For example, a first firing signal is sent to address (P1, A1) to fire nozzle 1, the next firing signal is sent to address (P1, A2) to fire nozzle 7).

Steinfield et al. do not disclose wherein each of said subgroups supplied with fluid through the fluid supply slot and being fluidically isolated from other subgroups on the surface, and each subgroup includes a chamber and at least two firing resistors or a pair of drop generators (**Referring to claims 49, 55, 61**).

Maeda discloses a liquid jet printhead having nozzles/drop generators arranged into subgroups (FIG. 29: two elements 7), wherein each comprises at least two nozzles/drop generators (FIG. 29: two elements 7), a chamber (FIG. 29, element 7), and at least two firing resistors (FIG. 29, element 6), and being fed with liquid ink through a corresponding ink flow

path isolated from other subgroup by the barrier layer/orifice layer (FIG. 29: each group of two elements 7 is fluidically isolated from an other group by element 4).



Therefore, it would have been obvious for one having ordinary skill in the art at the time the invention was made to modify the arrangement of the drop generators formed on the substrate disclosed by Steinfield et al. such that drop generators are arranged into subgroups, each comprises at least two drop generators and being fluidically isolated from other subgroups as disclosed by Maeda. The motivation of doing so is to be capable of constantly maintaining good stable ink ejection conditions to obtain high quality images as taught by Maeda (column 3, line 34-38).

Steinfeld et al. also disclose the following claimed invention:

Referring to claims 47, 63: wherein the printhead electronics activates the drop generators in the columnar group of drop generators one at a time (column 5, line 24-27).

Referring to claims 48, 64: the columnar group of drop generators is a primitive, and the substrate comprises a plurality of primitive arranged in a column (FIG. 14).

Referring to claims 52-53, 69-60, 66, 68: further including a fluid supply fluidically coupled to the fluid feed slot to supply the feed slot with fluid, wherein the fluid supply is a supply of liquid ink (Abstract).

Referring to claim 67: further comprising replacing fluid to the fluid source (column 5, line 20-24).

Referring to claim 57: an apparatus for imparting relative motion between the printhead substrate and a print media (FIG. 25).

Referring to claim 58: a fluid source commonly coupled to all of the drop generators in a column group (FIG. 13, element 52).

3. Claims 50-51, 54, 62, 69, 70-71 are rejected under 35 U.S.C. 103(a) as being unpatentable over Steinfield et al. (US 5984464) in view of Maeda (US 6053599), as applied to claims 46, 56, 65, and further in view of Allen (US 4746935).

Steinfield et al., as modified, disclose the claimed invention as discussed above except wherein the substrate has a plurality of fluid feed holes formed therein to provide fluid to each of the subgroups of drop generators (**Referring to claims 50, 62, 71**), wherein the substrate includes a thin film layer that overlays the fluid feed slot, the thin film layer having openings that couple each of the subgroups to the fluid feed slot (**Referring to claims 51, 69, 70**), and wherein the thin film layer comprises a plurality of thin film, the thin film layer forming heater resistor in each of the drop generators (**Referring to claim 54**).

Allen discloses an apparatus useful for eight-level halftone thermal inkjet printing by printing with droplets of ink with volumes weighted in a binary sequence (Abstract). The apparatus comprises a printhead having plurality of nozzles (FIG. 5A, elements 84, 86, 88)

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grouped into subgroups (FIG. 1A-D) and a substrate (FIG. 3A, element 30) having a plurality of fluid feed holes (FIG. 3A, element 32) formed therein to provide fluid to each of the subgroups of drop generators (FIG. 3A, elements 50, 52, 54), wherein the substrate includes a thin film layer that overlays the fluid feed slot (column 4, line 16-20: “a first layer of silicon dioxide SiO₂, will be grown or deposited on a silicon substrate surface”), the thin film layer having openings that couple each of the subgroups to the fluid feed slot (FIG. 3A, element 32), and wherein the thin film layer comprises a plurality of thin film (column 4, line 15-24: The thin film layer includes two layers deposited on the substrate: the SiO₂ layer and a resistive layer such as tantalum-aluminum), the thin film layer forming heater resistor in each of the drop generators (FIG. 3A, elements 34, 36, 38).

Therefore, it would have been obvious for one having ordinary skill in the art at the time the invention was made to modify the printhead disclosed by Steinfield et al., as modified, such as forming a plurality of fluid feed holes in the substrate to provide fluid to each of the subgroups of drop generators as disclosed by Allen. The motivation of doing so is to isolately provide fluid to individual subgroup of drop generators in order to reduce crosstalk to gain printing quality as taught by Allen (column 3, line 54-56).

Allowable Subject Matter

Claims 41-42 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Referring to claim 41: The most cited pertinent prior art fails to disclose printhead electronics that provide firing pulses to the drop generators such that no two nozzles of each

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nozzle subgroup are fired sequentially. Therefore, the claimed invention is not disclosed by the cited prior art.

Claim 42 is allowable because it depends on claim 41.

Response to Arguments

Applicant's arguments with respect to claims 40 and 45 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to LAM S NGUYEN whose telephone number is (571)272-2151. The examiner can normally be reached on 7:00AM - 3:30PM.

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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, STEPHEN D MEIER can be reached on (571)272-2149. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

LN

March 21, 2004



HAI PHAM
PRIMARY EXAMINER